

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2004/002683

International filing date (day/month/year)
18.08.2004

Priority date (day/month/year)
25.08.2003

International Patent Classification (IPC) or both national classification and IPC
B60L11/18

Applicant
TOYOTA JIDOSHA KABUSHIKI KAISHA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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10/565101

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IB2004/002683

1AP20 Rec'd PCT/IB 19 JAN 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/002683

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

PCT/IB2004/002683

Re Item V.

- 1 The following documents are referred to in this communication:

D1 : US 2001/053950 A1 (AOYAGI SATOSHI ET AL) 20 December 2001 (2001-12-20)
D2 : DE 101 61 965 A (PLUG POWER INC) 11 July 2002 (2002-07-11)
D3 : EP 1 286 405 A (TOYOTA MOTOR CO LTD) 26 February 2003 (2003-02-26)
D4 : PATENT ABSTRACTS OF JAPAN vol. 2002, no. 03, 3 April 2002 (2002-04-03) & JP 2001 307758 A (TOYOTA MOTOR CORP), 2 November 2001 (2001-11-02)

- 2 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document):

A fuel cell system including a fuel cell (figure 1, ref. 11), electric power storing means (figure 1, ref. 12), and electric power supplying means (figure 1, wiring) for supplying electric power to a load from the fuel cell and the electric power storing means, wherein the electric power supplying means includes intermittent operation means (page 4, paragraph 65) for stopping and starting the fuel cell according to a reference value.

From this, the subject-matter of independent claim 1 differs in that:

The fuel cell is stopped when an amount of power required by the load is smaller than a reference value, and the fuel cell is started when the amount of electric power required by the load is equal to or larger than the reference value, wherein threshold value adjusting means are provided for adjusting the reference value according to the internal electromotive force in the fuel cell whose operation has been stopped.

- 2.1 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT)
The problem to be solved by the present invention may be regarded as:

Improving the response of the fuel cell system.

- 2.2 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

None of the cited documents D1 to D4 discloses to vary the reference value according to the electromotive force of the fuel cell.

Document D1 deals with maintaining the supply voltage of an electrical vehicle within an upper and a lower limit of a hysteresis.

Document D2 discloses not to modify the controlling of the fuel cell as long as the power requirement is kept within a certain hysteresis.

Document D3 is directed to efficiently using a fuel cell by storing outputted power during low power demand zones into a capacitor.

Document D4 teaches to start and stop a fuel cell system depending on the power demand of a vehicle.

Thus, there is no indication given in the cited documents D1 to D4 which would lead the skilled person towards varying the reference value according to the electromotive force of the fuel cell.

- 2.3 Claims 2-7 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

- 2.4 Claim 8 is directed to a method of using the apparatus according to claim 1. The method steps according to the subject matter of claim 8 represent steps of purposive use of the apparatus features according to claim 1. Therefore, the above reasoning with respect to the subject matter of claim 1 applies mutatis mutandis to the subject matter of claim 8.

Consequently, the subject matter of claim 8 is considered as new (Article 33(2)PCT) and involving an inventive step (Article 33(3) PCT).

- 2.5 Claim 9 is dependent on claim 8 and as such also meets the requirements of the PCT with respect to novelty and inventive step.